REMARKS

With this Amendment, Claims 8-23 and 25-28 are pending in the present application.

Written Description/Definiteness under 35 U.S.C. § 112

Claims 8-23 and 25-28 were rejected under 35 U.S.C. § 112, first paragraph as being based on a non-enabling disclosure. The Examiner asserted that, "The specific materials of the die attach layer which are critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure." The Examiner further asserted that there is no place in Claim 8 or in the disclosure what material has the property of a die attach layer with a thermal expansion coefficient of less than about 106 ppm/°C. Applicant respectfully submits that neither of these assertions is true. Applicant further submits that, upon on reading Applicant's disclosure at the time the application was filed, a person having ordinary skill in the art would have been enabled to make and use the claimed inventions recited in Claims 8-23 and 25-28 without undue experimentation.

The test of enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the application coupled with information known in the art without "undue experimentation." (see M.P.E.P. §2164.01 and cases cited therein). Applicant respectfully submits that this test is satisfied with respect to the claims of the present application, and that a person having ordinary skill in the art would be able to make a die attach layer, adhesive layer or compliant material with the claimed properties by using readily available materials and without the need for undue experimentation.

Applicant traverses the rejection and respectfully disagrees with the Examiner's assertion that "there is no place in the disclosure what material has [the] property [of a thermal expansion coefficient of less than about 106 ppm/°C]." Applicant notes that the above-identified application discusses both materials and properties of embodiments of the die attach layer. For example, the paragraph on page 8, lines 20-28 of the present application states:

> "The die attachment layer 80 can be made from an epoxy modified with elastomeric material used to prevent breakage of the leads 55 from the die 10 at the heel 86 (the heel break). The thickness of the layer is preferably about 3 to 9 mils, more preferably about 5 to 7 mils. In one embodiment, the die attach layer has a modulus of elasticity of about 126 ksi at room temperature. This die attachment layer preferably has a glass transition temperature T_g of about 42°C, a coefficient of thermal

expansion of about 106 ppm/°C below T_g, and a CTE of about 234 ppm/°C above T_g. Such a material is available from Ablestik Lab of Rancho Dominguez, California, No. RP 559-2A."

Moreover, Applicant respectfully submits that as discussed in M.P.E.P. §2164.02, "Compliance with the enablement requirement of 35 U.S.C. § 112, first paragraph, does not turn on whether an example is disclosed." (emphasis added) Thus, any assertions about the presence or absence of "the specific materials of the die attach layer" are insufficient to establish a lack of enablement without some showing as to why the Examiner believes that a person having ordinary skill in the art would not be enabled to make or use the invention.

Furthermore, Applicant respectfully disagrees with the Examiner's assertion that "the specific materials of the die attach layer" are critical or essential to the practice of the invention. M.P.E.P.§ 2164.08(c), states "In determining whether an unclaimed feature is critical, the entire disclosure must be considered. Features which are merely preferred are not to be considered critical. *In re Goffe*, 542 F.2d 564, 567, 191 USPQ 429, 431 (CCPA 1976)." Applicant respectfully submits that the language of Applicant's disclosure clearly does not indicate that "the specific materials of the die attach layer" are critical or essential to the practice of the invention as suggested in the Office Action. Instead, Applicant's disclosure indicates that many embodiments are possible. Applicant further submits that the Examiner has not indicated any portion of the Applicant's disclosure which could even be interpreted as implying the criticality of "the specific materials of the die attach layer." Thus, without any evidence that the feature is critical, Applicant respectfully submits that the enablement rejection on the basis of an unclaimed but critical feature is improper.

Applicant notes that the Examiner has repeatedly rejected numerous claims in the present application as being obvious in view of the prior art. While Applicant disagrees with the obviousness rejections in each case, Applicant notes that the Examiner's repeated assertions that the claimed subject matter "would have been obvious to one of ordinary skill in the art at the time the invention was made," suggest that the Examiner believes that a person having ordinary skill in the art would be able to make the claimed die attach layer, adhesive layer or compliant material given the teachings of the prior art. This suggestion would appear to be in direct contradiction with the Examiner's enablement rejection, which

amounts to an assertion that a person having ordinary skill in the art would not be able to make the claimed invention from reading Applicant's specification. This contradiction arises out of the fact that the prior art cited by the Examiner teaches no more than the layer being made of a resilient thermoset or thermoplastic material. After repeated assertions that one skilled in the art would be able to make the claimed device given this simple disclosure from the prior art, it is contradictory to suggest that the same person would not be able to make the same claimed device given the same prior art disclosures in addition to Applicant's own disclosure. If the Examiner feels that one skilled in the art would be able to make the claimed device given the simple disclosure from the prior art, Applicant submits that one skilled in the art would certainly be able to make the claimed invention from reading Applicant's specification.

Therefore, Applicant respectfully submits that Claims 8-23 and 25-28 are fully enabled by the disclosure of the present application for at least the reasons discussed above and Applicant respectfully requests that the rejections of Claims 8-23 and 25-28 under 35 U.S.C. § 112, first paragraph be withdrawn.

Anticipation under 35 U.S.C. § 102

Claims 25-27 were rejected under 35 U.S.C. § 102(b) as being anticipated by Khandros et al. Based on the reference numbers indicated in the Office Action, Applicant assumes that this rejection is over U.S. Patent No. 5,148,265 to Khandros et al. and the following remarks are made based on that assumption. The Examiner asserted that Khandros teaches an integrated circuit package, comprising: a flexible substrate (66); a chip (20); a plurality of conductive terminals (70) on the substrate; a plurality of conductive leads (48) electrically connecting the conductive terminals to the chip; and a compliant material (58) between the chip and the substrate. The Examiner also asserts that Khandros teaches that the compliant material is an elastomer compliant layer. The Examiner further asserts that "it is inherent that [the compliant layer of Khandros] can have a modulus of elasticity of less than about 126 ksi and a coefficient of thermal expansion of less than about 106 ppm/°C." Applicant respectfully traverses the rejections. Claim 25 recites *inter alia* "the compliant material having a modulus of elasticity of less than about 126 ksi at room temperature and a coefficient of thermal expansion of less than about 200 ppm/°C." (emphasis added)

Applicant notes that, as discussed in M.P.E.P. §2112, "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" In re Robertson, 169 F.3d 743 745, 49 USPQ2d 1949, 1950-51.

Thus, while it may be possible to make an elastomeric material of the types described in Khandros '265 to have the claimed properties, the Examiner has not provided any evidence to suggest that such properties are necessarily present in those materials. In fact, the Office Action states that "it is inherent that [the elastomer compliant layer of Khandros] can have a modulus of elasticity of less than about 126 ksi and a coefficient of thermal expansion of less than about 106 ppm/°C" (emphasis added). This suggests that the Examiner acknowledges that the recited properties merely represent possibilities of the materials described by Khandros.

Applicant therefore respectfully submits that the claimed properties are not inherent in the materials described by Khandros et al, and thus Claims 25-27 are not anticipated by Khandros. For at least these reasons, Applicant respectfully requests that the rejections of Claims 25-27 under 35 U.S.C. § 102(b) be withdrawn.

Additionally, while Applicant disagrees with the anticipation rejection, Applicant notes that the Examiner's assertion that the claimed properties are inherent in prior art materials is inconsistent with the Examiner's assertion that a person having ordinary skill in the art would not be enabled to make a material with the claimed properties.

Obviousness under 35 U.S.C. § 103

Claims 8-23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over DiStefano et. al. (U.S. Patent No. 5,821,608). With regard to Claims 8, 15, 17 and 19-23 the Examiner repeatedly asserts that although DiStefano fails to explicitly teach a die attach layer with the claimed properties, doing so would have been obvious to a person having ordinary skill in the art "in order to compensate for thermal mismatch in the package, and since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art."

As discussed in both of the previous amendments, Applicant respectfully disagrees with the characterization of the recited limitations as being simply "optimum" ranges. Applicant submits that a rejection based on "optimum or workable ranges" is inappropriate where the prior art does not teach or suggest the desirability of the result achieved. As discussed in MPEP § 2144.05, "[a] particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." In re Antonie, 559 F.2d 618, 195 U.S.P.Q. 6 (CCPA 1977). Thus, for a rejection to be made based on "optimum or workable ranges," the prior art must first identify the result which the variable achieves in addition to the variable to be optimized.

As discussed previously, in one embodiment of the above-identified application, the problem of thermally induced heel break can be substantially eliminated by providing a die attach layer with a coefficient of thermal expansion less than about 200 ppm/°C and a modulus of elasticity of between about 10 ksi and about 126 ksi. As described at page 9, lines 23-29 of the specification of the present application, a higher modulus of elasticity will decrease the movement within the compliant layer, and will thereby decrease the stress at the heel. Thus, by providing a compliant layer with a modulus of elasticity which is higher than has been used in the prior art, the problem of heel break can be substantially avoided.

Applicant respectfully submits that DiStefano '608 does not teach or suggest the desirability of varying either the coefficient of thermal expansion or the modulus of elasticity for any reason, let alone in addressing the problem of heel breakage. Accordingly, without disclosing this desired result or the variables to be optimized, DiStefano '608 cannot be used to reject the claims on the basis that the parameters affecting this result are merely "optimum or workable" ranges that would be known to one of skill in the art.

The Examiner appears to be suggesting that a person having ordinary skill in the art would optimize the properties recited in Applicant's claims "in order to compensate for thermal mismatch in the package." However, there is no suggestion in DiStefano '608 to vary either the coefficient of thermal expansion or the modulus of elasticity of the compliant layer for any reason. Applicant notes that the "CTE mismatch" discussed in DiStefano is a mismatch between the CTE of the substrate and the CTE of the chip, but the CTE of the

compliant layer is not even discussed in DiStefano. The solution to the problem of thermal mismatch, as outlined by DiStefano '608, is to vary the thickness of the compliant layer (for example, see Column 6, lines 3-11 of DiStefano '608), but there is no suggestion to modify either the coefficient of thermal expansion or the modulus of elasticity of the die attach layer. The compliant layer of DiStefano is intended to provide "resiliency to the individual terminals, allowing each terminal to move in relation to its electrically connected chip contact to accommodate CTE mismatch as necessary" (see Column 2, lines 31-34).

For at least the above reasons, Applicant respectfully submits that the Examiner has not established a *prima facie* case of obviousness with respect to any of independent Claims 8, 15, 17 and 21. Thus, Applicant respectfully requests that the rejections of those claims be withdrawn. Additionally, dependent claims 9-14, 16, 18-20, 22, 23 and 28 include the unique combinations of limitations recited in their respective base claims as well as additional combinations of limitations also not taught or suggested by the prior art of record. For at least these reasons, Applicant requests that the rejections of these claims be withdrawn as well.

CONCLUSION

In view of the foregoing, Applicant submits that the claims of the present application are in condition for allowance, and Applicant respectfully requests that the present application be passed to allowance at the earliest possible date. The undersigned has made a good faith effort to respond to all of the rejections and objections in the present application and to place the claims into condition for allowance. Nevertheless, if any issues remain which can be resolved by telephone, the Examiner is respectfully requested to call Applicant's representative at the number indicated below in order to resolve such issues promptly.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: 10/29/03

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